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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/AU92/00147

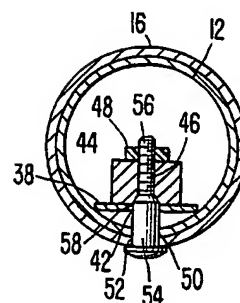
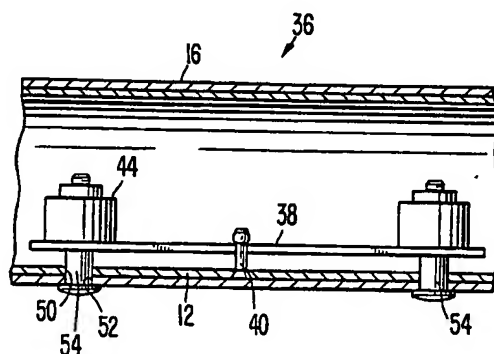
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With international search report.

(54) Title: CONNECTOR ASSEMBLY FOR USE WITH A RACING SULKY



(57) Abstract

A connector assembly (36) for connecting two tubes (12, 16) at a telescoped portion thereof. The connector assembly (36) has an elongated member (38) with a plurality of openings (42) therein connected by a rivet (40) and extending longitudinally along an inside surface portion of interior tube (12). The inside surface portion is in telescoped relation to a portion of exterior tube (16). Each tube (12, 16) has a plurality of registered openings (50, 52) along the telescoped portion thereof. A plurality of spaced-apart fasteners (44), each having a threaded opening (46) extending substantially normal to the longitudinal axis of the telescoped portion of the interior and exterior tubes (12, 16), are attached to the elongated member (38) concentrically with respective openings (42). A screw (54) having a threaded portion (56) extends through each of the registered openings (42, 50, 52) in the elongated member (38) and in the tubes (12, 16) with the threaded portion (56) being in threaded engagement with the threaded opening (46) of each of the spaced-apart fasteners (44) and attached nylon bushing (48). The interior tube (12) may comprise a shaft of a sulky and the exterior tube (16) a back bend of a sulky.

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CONNECTOR ASSEMBLY FOR USE WITH A RACING SULKY

The invention relates to a connector assembly for connecting two tubes at a telescoped portion thereof, and particularly wherein the interior tube is a shaft of a sulky and the exterior tube is a back bend of the sulky, or where the interior tube is a shaft point of a sulky, and the exterior tube is the shaft body of a sulky.

BACKGROUND OF THE INVENTION

10 A sulky is a horse-drawn two-wheeled vehicle that is used throughout the world in competitive horse racing, known as harness racing. Sulkies are often of tubular construction that includes a generally U-shaped component known as a back bend connected to a pair of forwardly extending shafts adapted for attachment to a horse positioned therebetween. Where a U-shaped back bend is not used, the undercarriage or arch of the sulky is fitted with a pair of forwardly facing tubular components to receive the shafts in telescoping fashion functionally similar to that of a back bend.

Conventionally, the shafts are fixed to the back bend by having a portion of the shaft with a smaller outside diameter than the inside diameter of the back bend. This permits the shaft to be inserted in telescoping fashion into the back bend. With the shaft and back bend in the proper relative telescoped position, holes are drilled through both the shaft and the back bend at the telescoped portion thereof while the shaft is held in accurate alignment to the plane of the back bend. Blind rivets of the protruding head type are then inserted through the registered openings and set to secure the shaft to the back bend. Generally, at least two spaced-apart rivets and corresponding holes must be provided for this purpose. This practice has been found to be cumbersome and often results in improper or insecure fastening of the shafts to the back bend of the sulky. This is particularly the case where this assembly operation is performed at the racetrack, where sophisticated equipment for assembly is not available.

OBJECTS OF THE INVENTION

It is a primary object of the present invention to provide a connector assembly particularly adapted for use in the construction and assembly of a racing sulky that avoids the prior-art problems discussed above with respect to fastening the shafts of the sulky to the back bend.

SUMMARY OF THE INVENTION

In accordance with the invention, a connector assembly is provided for connecting two tubes at a telescoped portion thereof. The connector assembly has an elongated member with a plurality of openings therein. The elongated member is connected to and extends longitudinally along an inside surface portion of an interior tube, with the inside surface portion being in telescoped relation to a portion of an exterior tube. Each tube has a plurality of registered openings along the telescoped portion thereof. A plurality of spaced-apart fasteners, each having a threaded opening extending substantially normal to the longitudinal axis of the telescoped portions of the tubes, is attached to the elongated member with each threaded opening being in register with one of the plurality of openings in the elongated member and in the tubes. A screw is provided having a threaded portion extending through each of the registered openings in the elongated member and in the tubes, with the threaded portion being in threaded engagement with the threaded opening in each of the spaced-apart fasteners.

Only two spaced-apart fasteners may be provided, with one fastened to each opposed end of the elongated member. Only two openings are provided in the elongated member, one thereof in register with each of the threaded openings of the two fasteners.

Each threaded opening in the fasteners may have a lock washer of resilient material into which the threaded portion of the screw extends to secure the screw within the fastener.

The interior tube may be a shaft of a sulky, and the exterior tube may be a back bend of the sulky.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention as claimed. The accompanying drawings, which are incorporated herein by

reference and constitute a part of this specification, illustrate a preferred embodiment of the invention, and, together with the description, serve to explain the principles of the invention.

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BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 of the drawings is a side elevation of one embodiment of a sulky with which the connector assembly of the invention may be used;

Fig. 2 is a plan view of the sulky of Fig.1;

Fig. 3 is a front elevation of the sulky of Fig. 1; and

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Figs. 4A and 4B are detailed views in partial cross-section of one embodiment of a connector assembly in accordance with the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

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With reference to the drawings, and for the present to Figs. 1, 2, and 3 thereof, there is shown an embodiment of a sulky in accordance with the invention, designated generally as 10. The sulky has a pair of shafts 12 extending forwardly one on either side of the sulky. The shafts are of tubular construction. At a forward end of the shaft is a portion thereof generally known as a point, which is designated as 14. The opposite end of the shafts 12 are connected to a generally U-shaped tubular structure 16, commonly termed a "back bend" or "back bow" with the connection being designated as 17. An undercarriage, designated generally as 18, extends generally transversely beneath the back bend 16.

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The undercarriage 18 includes an upper transverse tube 20 and a lower transverse tube 22. These tubes are connected to a pair of rear struts 24. The struts 24 are connected to wheels 26 on opposite sides thereof at a wheel hub 28 connected to opposite ends of axle 30. A pair of front struts 32 is connected also to the hub 30 of each wheel at one end thereof with an opposite end connected to shaft 12 by a fastener 34.

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The connector assembly of the invention is designated generally as 36 in Fig. 4. This assembly 36 is used in accordance with the invention to connect the shaft 12 to the back bend 16 at the connecting ends thereof designated as 17 in Figs. 1, 2 and 3. The

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connector assembly 36 comprises an elongated plate 38 connected to and extending longitudinally along the interior of the shaft 12. The plate 38 is mounted to the shaft 12 by a rivet 40. Openings 42 are provided near opposed ends of the plate 38. Concentrically mounted to each opening 42 is a fastener 44 having a tapped opening 46. The end of this opening is provided with a nylon bushing 48. The shaft 12 and the back bend 16 are each provided with mating openings 50 and 52, respectively. A screw 54 having a threaded portion 56 extends through the openings 50 and 52, and opening 58 in the plate 38 with the threaded portion 56 extending into the opening 46 of the fastener 44. The end of the threaded portion 56 deforms the nylon bushing 48 which firmly secures the screw within the assembly.

With the assembly shown in Fig. 4, it is preferred that the openings 50 and 52 in the shaft 12 and back bend 16 respectively, be produced by a punching rather than a drilling operation to provide for improved accuracy of size relative to the size of screw 54, so that the screw 54 fits tightly within these openings upon assembly. All of the openings in the assembly are preferably preformed for accuracy purposes and ease of subsequent assembly in the field. In this manner, the conventional drilling operations required to assemble the shafts to the back bend of the sulky at a racetrack location are avoided. It may be seen, therefore, that the connector assembly of the invention provides for easy assembly in the field without requiring the use of sophisticated tooling. For this purpose, all that it is necessary is an ordinary screwdriver to tighten the screws 54.

It will be apparent to those skilled in the art that various modifications and variations can be made to the connector assembly of the present invention and in the construction of the connector and fastener means of the present invention, without departing from the scope or spirit of the invention. For example, the configuration, shape, and other physical parameters of the elements of the invention could each be modified or varied, provided their ability to fasten is not substantially impaired. Various modifications can be made to the connector assembly and fastener means of the present invention. Specifically, the size, shape, number, and disposition of the threaded openings and threaded screws can be varied, provided they retain their ability to effectively fasten the sulky members. Thus, it is intended that the present invention cover the modifications and variations of the invention provided they come within the

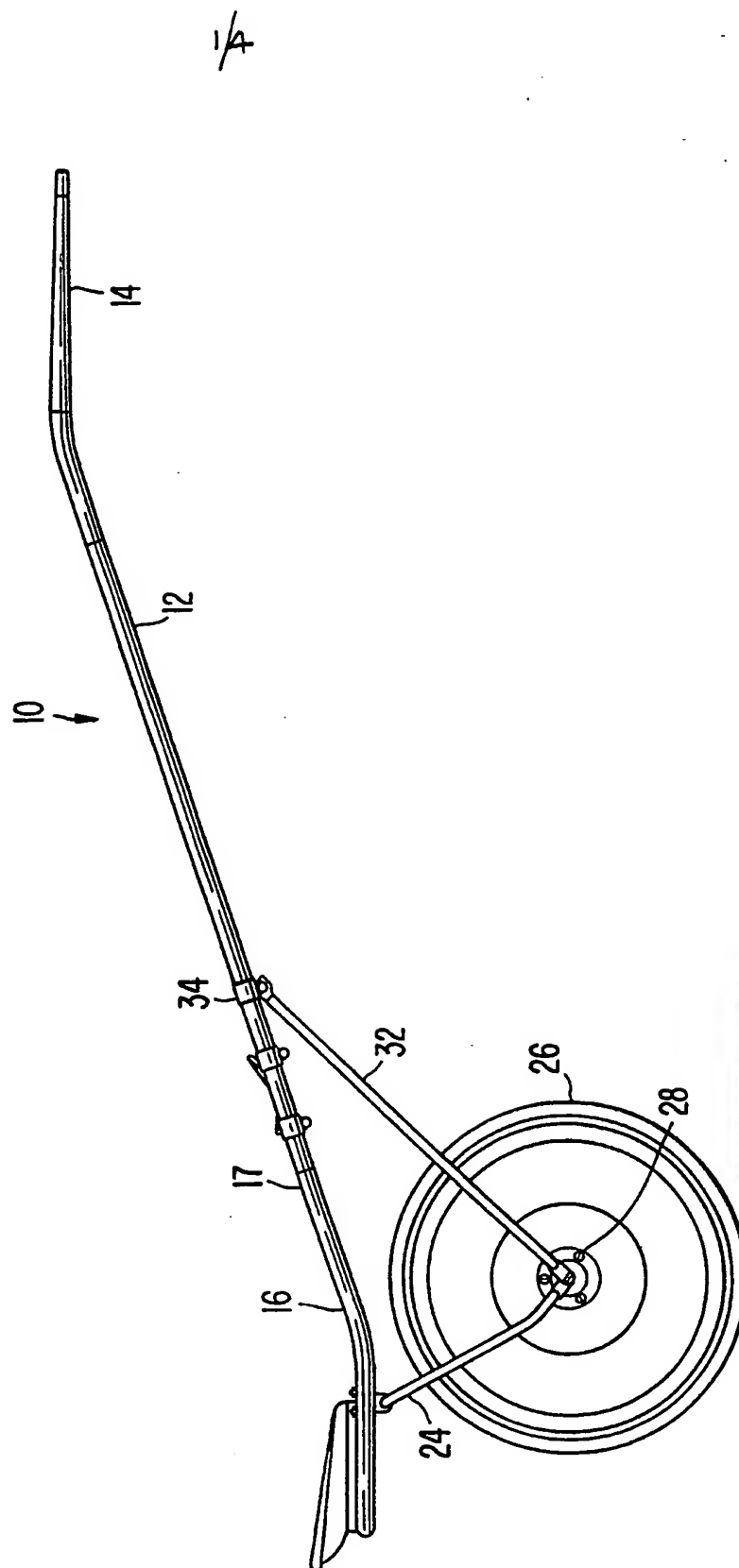
scope of the appended claims and their equivalents.

I CLAIM:

1. A connector assembly for connecting two tubes at a telescoped portion thereof, said connector assembly comprising an elongated member having a plurality of openings therein connected to and extending longitudinally along an inside surface portion of an interior tube, with said inside surface portion being in telescoped relation to a portion of an exterior tube, each said tube having a plurality of registered openings along said telescoped portion, a plurality of spaced-apart fasteners each having a threaded opening extending substantially normal to a longitudinal axis of said telescoped portion of said interior and exterior tubes attached to said elongated member with each said threaded opening being in register with one of said plurality of openings in said elongated member and in said tubes, and a screw having a threaded portion extending through each of said registered openings in said elongated member and in said tubes with the threaded portion being in threaded engagement with said threaded opening of each of said spaced-apart fasteners.
2. The connector assembly of claim 1, wherein only two spaced-apart fasteners are provided, one thereof fastened to each opposed end of said elongated member and only two openings are provided in said elongated member, one thereof in register with each said threaded opening of each said fastener.
3. The connector assembly of claim 2, wherein each said threaded opening in each said fastener has a lock washer of resilient material into which said threaded portion of said screw extends to secure said screw within said fastener.
4. The connector assembly of claim 1, wherein said interior tube is a shaft of a sulky and said exterior tube is a back bend of said sulky.
5. The connector assembly of claim 4, wherein only two spaced-apart fasteners are provided, one thereof fastened to each opposed end of said elongated member and only two openings are provided in said elongated member, one thereof in register with each said threaded opening of each said fastener.

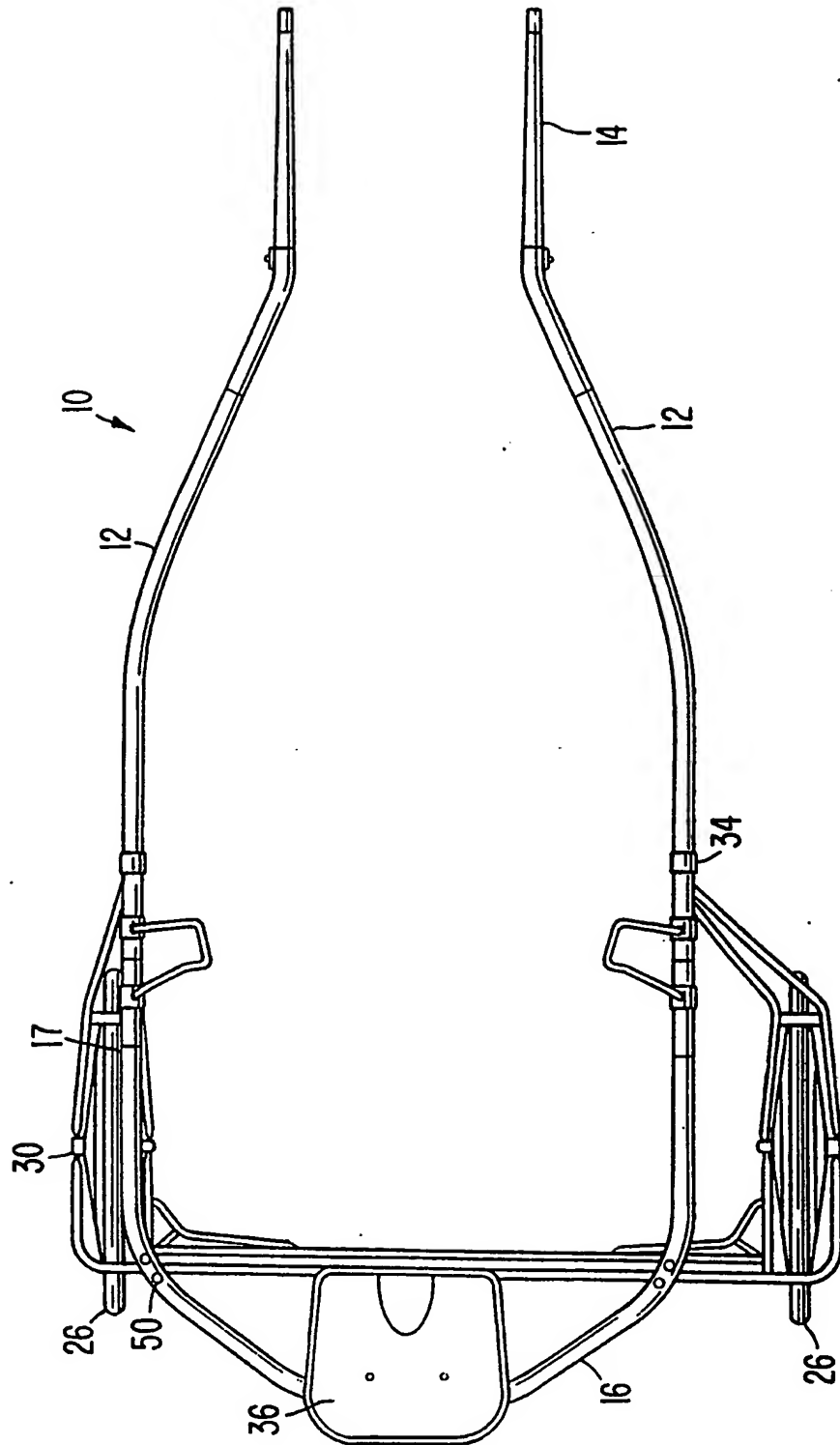
6. The connector assembly of claim 5, wherein each said threaded opening in each said fastener has a lock washer of resilient material into which said threaded portion of said screw extends to secure said screw within said fastener.

FIG. 1



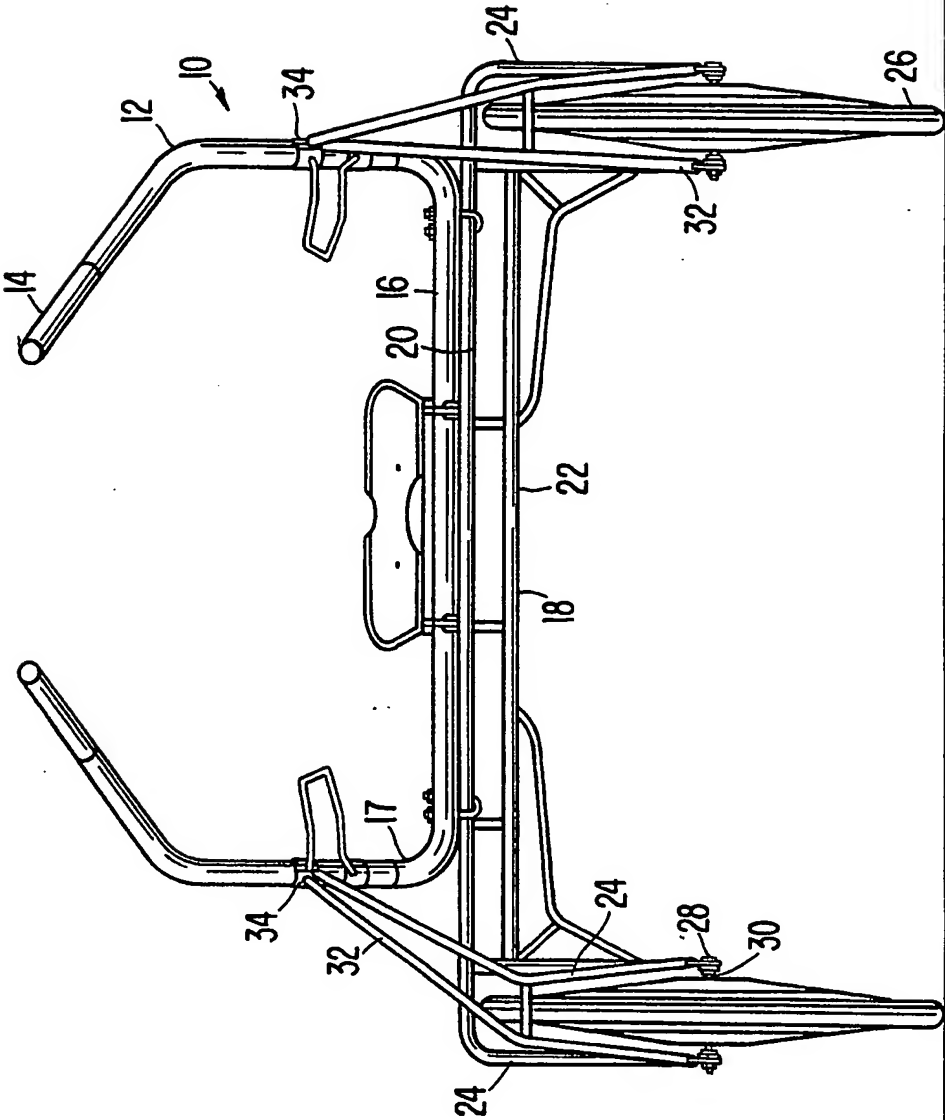
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FIG. 2

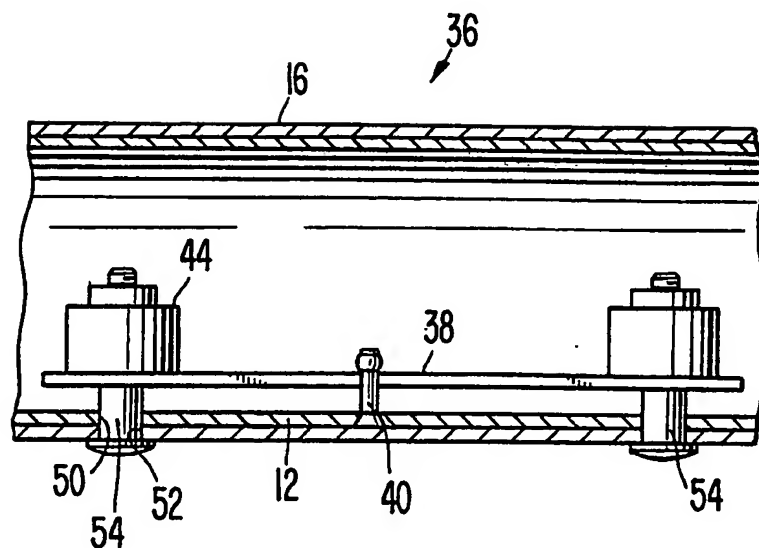
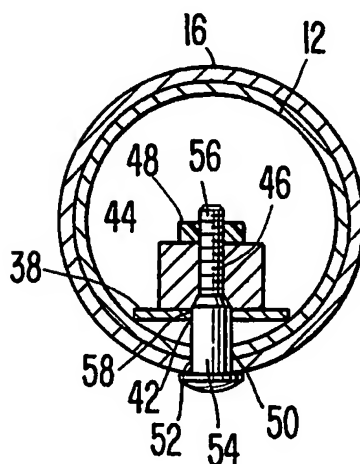


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FIG. 3



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FIG. 4A**FIG. 4B**

INTERNATIONAL SEARCH REPORT

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent classification (IPC) or to both National Classification and IPC Int. Cl. ⁸ F16B 7/10, 7/18, B62C 1/08, 5/02		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
IPC	F16B 7/10, 7/18, B62C 1/08, 5/02	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
AU : IPC as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT ⁹		
Category [*]	Citation of Document, ¹¹ with indication, where appropriate of the relevant passages ¹²	Relevant to Claim No ¹³
X,Y	GB,A, 1262627 (CASSEL) 2 February 1972 (02.02.72). See page 5, lines 19-29, 64-67 and 75-81; page 6, lines 16-27 and 71-77; page 6, line 126 to page 7, line 2; page 7, lines 13 to 18 and Figures 1-4, 8-10 and 12-14.	(1-6)
Y	US,A, 3907325 (GAINES et al) 23 September 1975 (23.09.75), See column 2, lines 33-40; column 2, line 59 to column 3, line 1 and Figure 1A.	(4)
(continued)		
<p>[*] Special categories of cited documents : ¹⁰</p> <p>"A" Document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> <p>"T" Later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"&" document member of the same patent family</p>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search 18 June 1992	Date of Mailing of this International Search Report 1 July 1992 (01. 07. 92)	
International Searching Authority AUSTRALIAN PATENT OFFICE	Signature of Authorized Officer C.M. WYATT	

FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

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V. ☐ OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE ¹

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claim numbers , because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claim numbers , because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claim numbers , because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4a

VI. ☐ OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING ²

This International Searching Authority found multiple inventions in this International application as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.
2. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4. ☐ As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

- ☐ The additional search fees were accompanied by applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)

Category*	Citation of Document, ¹¹ with indication, where appropriate of the relevant passages ¹²	Relevant to Claim No ¹³
A	FR,A, 2414655 (SOCIETE DITE: L'EQUIPMENT ROUTER) 10 August 1979 (10.08.79).	
A	US,A, 4504164 (BIEN) 12 March 1985 (12.03.85).	
A	US,A, 4921367 (EVERETT, II et al) 1 May 1990 (01.05.90).	
A	US,A, 1861814 (PETERS) 7 June 1932 (07.06.32).	